DETERMINATION OF RAINFALL TREND AT UNIVERSITI MALAYSIA PAHANG (UMP) CAMPUS AT GAMBANG AND PEKAN USING BOX-PLOT METHOD

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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Date : 30 MAY 2019

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Thesis submitted in fulfillment of the requirements
for the award of the
B. Eng (Hons.) Civil Engineering

Faculty of Civil Engineering and Earth Resources

UNIVERSITI MALAYSIA PAHANG

MAY 2019

ACKNOWLEDGEMENTS

Alhamdulillah. All praise be to Allah the All Mighty. The one and only God who has given me the strength to help and guiding me in completing this thesis.

I am grateful and would like to express my sincere gratitude to my supervisor Nadiatul Adilah binti Ahmad Abdul Ghani for her germinal ideas, invaluable guidance, continuous encouragement and constant support in making this thesis possible. I appreciate her consistent support from the first day I began the final year project to these concluding moments. I am truly grateful for her tolerance of my naive mistakes. I also sincerely thanks for the time spent proofreading and correcting my many mistakes.

My sincere thanks go to all members of the staff of the hydraulic and hydrology laboratory, UMP, who helped me in many ways to carry out my research. Many special thanks go to all my friends for their help, inspirations and supports during this study.

I acknowledge my sincere indebtedness and gratitude to my parents, Md. Uzairin bin Saidin and Afliza binti Che Jaafar for their love, dream and sacrifice throughout my life. I acknowledge their sincerity and consistent encouragement for me to carry on my higher studies in Malaysia. I am also grateful to my family for their sacrifice, patience, and understanding that lead to this work possible. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to attain my goals.

ABSTRAK

Perubahan iklim merujuk kepada perubahan dari segi pemendakan. Fenomena ini telah pun bermula merubah corak hujan dalam Malaysia. Data hujan, data suhu, dan data evaporasi dikumpul dan direkodkan setiap bulan untuk memaparkan hubungan antara hujan, suhu dan evaporasi untuk menentukan corak kitaran hidrologi. Kaitan yang diperolehi dapat memaparkan corak cuaca di kampus Universiti Malaysia Pahang (UMP) di Gambang dan di Pekan. Dengan pemantauan kondisi cuaca, ia boleh membantu dalam mengawal aktiviti di UMP. Selain itu, data cuaca juga amatlah penting di dalam kehidupan seharian kita kerana hujan merupakan salah satu pertimbangan yang penting dalam membentuk larian kenderaan dan juga kawalan hakisan. Perubahan aliran dalam pengedaran hujan juga memberikan satu kesan kepada analisa hidrolgi terutama yang berkait dengan rekod sejarah hujan. Dengan itu, kaedah "box-plot" digunakan dalam menentukan corak aliran hujan dalam kitaran hidrologi. Ia telah ditunjukkan bahawa data hujan yang telah dikumpul setiap peristiwa hujan adalah berbeza setiap tahun, sebagai satu contoh untuk tahun 2016, sebanyak 991.4 mm telah dikumpulkan dan tahun berikutnya mengurang kepada 605.5 mm di tahun 2017 dan untuk tahun 2018 meningkat semula kepada 1020.9 mm untuk data di UMP Pekan. Manakala di kawasan UMP Gambang, sebanyak 1072.8 mm direkodkan untuk tahun 2016, kemudian mengurang sedikit pada tahun berikutnya, 2017 kepada 972.5 mm dan di tahun 2018 meningkat semula kepada 1309.8 mm. Ia menunjukkan setiap tahun terdapat perubahan dari segi peningkatan dan penurunan dari segi peristiwa hujan untuk kedua-dua kampus UMP.

ABSTRACT

Climate change leads to changes in precipitation. This phenomenon has already begin to transform rainfall pattern in Malaysia. Rainfall data, temperature data, and evaporation data are collected and recorded monthly to display the relationship between rainfall, temperature, and evaporation to determine the pattern of hydrologic cycle. The relationship obtained, would also display the weather pattern at campus Universiti Malaysia Pahang (UMP) in Gambang and Pekan. By monitoring of the weather conditions, it can help in controlling the activity in the UMP. Besides, weather data is very important in our life as the rainfall is an important consideration in design runoff conveyance and erosion control. Changing trend in rainfall distribution also gives an effect on hydrological analysis especially related to historical rainfall record. Box-plot method is employed to determine the rainfall trend of hydrologic cycle. It is shown that the rainfall data that was collected that the rainfall event differs every year, as an example for 2016, a total of 991.4 mm was collected and year after it decreased to 605.5 mm in 2017 and for 2018 raised slightly to 1020.9 for UMP Pekan. Whereas for UMP Gambang, 1072.8 mm in 2016, and also decreased slightly to 972.5 mm in 2017 and in 2018 increased to 1309.8 mm. Shows that each year that there are some increasing and decreasing trend of rainfall for each UMP campuses.

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°C	Celcius
%	Percentage
mm	millimeter

LIST OF ABBREVIATIONS

UMP	Universiti Malaysia Pahang
KK2	Kolej Kediaman 2
USB	Universal Serial Bus
Box-Plot	Box and whiskers Plot
Jan	January
Feb	February
Mar	March
Apr	April
Jun	June
Jul	July
Aug	August
Sep	September
Oct	October
Nov	November
Dec	December

CHAPTER 1

INTRODUCTION

1.1 Background of study

The normal features of the climate of Malaysia are uniform temperature, extensive rainfall and high humidity. Rainfall being predominant form of precipitation causing stream flow, especially the flood flow in a river. The magnitude of precipitation varies with time and space. Malaysia is observed to have a tropical climate, means the average temperature of the country, usually ranges from 21 °C to 32 °C and the humidity is range in between 70% to 90%. The climate is affected by the northeast and southwest monsoons, tropical wind that alternative during the course of the year. The direction of the wind in this inter-monsoon season is variable and usually more than 10 knots. Due to the seasonal rainfall in Malaysia, the probability of occurrence of rainfall amount is varied during the whole year. The northeast monsoon blows from November to March and the southwest monsoon from May to September. The primary goal of this project is to conduct experimental studies to identify the trend of rainfall event at UMP Gambang and Pekan campus.

1.2 Problem statement

Daily human activity is influenced by weather conditions, monitoring of weather conditions can help in controlling the activity. The behavior of and pattern changes of the weather is not all the same in the UMP Gambang and UMP Pekan area and its nearest place. It is important to monitor and study the pattern of weather at surrounding. Other than that, the weather consists of wind, humidity, temperature and precipitation. The pattern and trend of weather at Gambang and Pekan area can be identify by making analysis study of hydrological data from hydrological station.

1.3 Research Objectives

The objectives of this study are as following:-

i. To determine rainfall trend at UMP Gambang and Pekan campus.

ii. Set up and improving weather station in UMP Pekan campus.

1.4 Scopes of Study

This study focuses on determining the hydrology pattern. The hydrology data are obtained from the hydrology devices set up at Universiti Malaysia Pahang (UMP) Gambang and Pekan campus. The hydrology data is then organised and analysed to obtain the rainfall trend. The rainfall data will be collected and be focused on data from 2016 until 2019, which for the 2019 will only be collected from January until March and as for 2016, 2017 and until July of 2018 the data is collected from the past researches that have been working on collecting the rainfall data. The data will be based on daily, monthly and yearly data.

1.5 Significant of study

This study can help many future construction company, people to plan their daily activities and also future researchers for planning their schedule and also to complete their works. All the result results collected in this study will be compiled and a weather database for UMP can be recorded. The study also can identify the rainfall pattern of UMP Gambang and UMP Pekan area.

CHAPTER 2

LITERATURE REVIEW

2.1 Malaysian Climate

Malaysia is located at South East part of Asia where Peninsular Malaysia and East Malaysia is separated by the South China Sea. There are thirteen states and three federal territories in the country. Malaysia is observed to have a tropical climate, means the average temperature of the country are usually range from 21 °C to 32 °C and the humidity is range in between 70% to 90% (Tangang et al, 2012). The climate is affected throughout the year by the northeast and southwest monsoon, tropical winds that oscillate. From November to March the northeast monsoon blows and from May to September the southwest monsoon blows.

It is expected that climate change will cause adverse health effects. Due to heat stress or respiratory disease due to air pollution, a direct impact could be dead, while indirect effects could include increased food and water-borne diseases resulting from changes in rainfall pattern. There are numerous impact for the climate change due to natural course and anthropogenic activities. The amount and the times for extreme event to happen are increasing in future (Sunyer et al, 2012). In addition, the increase in temperature and rainfall will affect the water resources (Wang et al., 2013). Vector-borne diseases such as malaria and dengue fever could increase as temperature changes increase the vector's availability of appropriate reproduction environments. Furthermore, climate change will affect the production and consumption of electricity and the oil and gas industries. Due to increased coastal erosion, the operating and maintenance costs of electricity producers will be significantly increased to provide the necessary protection for power plants along the coast. An increase in air and water temperature will reduce plant efficiency and power output, resulting in higher cost of

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